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AUTHOR Austin, Erica Weintraub; Johnson, Kristine Kay
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ABSTRACT

One major challenge for intervention regarding alcohol is to target children with age-appropriate strategies while predictive risk and protective factors are still forming. Most intervention research has focused on children of preadolescent or adolescent ages, but recent work suggests that interventions may be most effective with children prior to their first experience with making drinking decisions. A study therefore evaluated the effectiveness of a media literacy lesson on 246 third graders from a northern midwestern town. The subjects were randomly assigned to four groups. The hypothesis that critical viewing training would affect children's perceptions of alcohol norms, alcohol portrayals in advertising, and alcohol-related behavior, was tested via one-way analysis of variance (ANOVA) and multivariate analysis of variance (MANOVA). The MANOVA, which tested for within-subject change over time between pretest and posttest, was significant only for perceptions of realism. The ANOVAs, however, showed significant group differences at posttest for the treatment and nontreatment groups on their understanding of persuasive intent, perceptions of realism, perceptions of social norms for alcohol use, and behavior. These results provide support for the value of media literacy programs at the third-grade level as a way to minimize the effects of alcohol advertising on the development of alcohol expectancies and related behavior among children. (Contains 3 figures, 7 tables of data, and 45 references.) (TB)

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Direct and Indirect Effects of Media Literacy Training on Third Graders' Decisionmaking for Alcohol

by

Erica Weintraub Austin
Assistant Professor
Edward R. Murrow School of Communication
Washington State University
Pullman, WA 99164-2520
E-Mail: EAUSTIN @ WSUVM1.CSC.WSU.EDU
PHONE: (509) 335-8840
FAX: (509) 335-1555

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and

Kristine Kay Johnson
Doctoral Student
Edward R. Murrow School of Communication
Washington State University
Pullman, WA 99164-2520

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Direct and Indirect Effects of Media Literacy Training on Third Graders' Decisionmaking for Alcohol

A Solomon four-group style experiment (n=246) tests the immediate and long-term effectiveness of media literacy training on third-grade children's perceptions of alcohol advertising, alcohol norms, expectancies for drinking, and behaviors toward alcohol. Short-term effects are found for understanding of persuasive intent, perceptions of realism and of social norms for alcohol use, and pre-drinking behavior. Results retain significance at delayed post-test only for perceived realism. A model of television interpretation processes that accounts for both rational and affective routes to decisionmaking among children also is tested and supported, particularly at post-test, suggesting that media literacy training can have both direct and indirect effects on children's use of television portrayals of alcohol use to make decisions about alcohol.

Direct and Indirect Effects of Media Literacy Training on Third Graders' Decisionmaking for Alcohol

One major challenge for intervention is to target children with age-appropriate strategies while predictive risk and protective factors are still forming. As a result, current efforts in alcohol abuse prevention have begun to focus on children's decisionmaking processes rather than addressing only the outcomes of that process (Fischhoff, 1992), including possible media influences on their decisionmaking for alcohol. This better addresses the complexities of behavior suggested by social cognitive theory (Bandura, 1986).

Most intervention research has focused on children of preadolescent or adolescent ages, but recent work suggests that interventions may be most effective with children prior to their first experience with making drinking decisions. The majority of children are not drinkers by third grade, for example, but precursors of drinking behavior are already well under development (Christiansen & Goldman, 1983; Goldman, Brown & Christiansen, 1987). Awareness begins early, with the majority of preschoolers able to identify alcohol by smell (Noll, Zucker & Greenberg, 1990). Attitudes towards drinkers exist by age six (Spiegler, 1983). Alcohol expectancies, "if-then" beliefs concerning perceived physical and social consequences of drinking, have been found as early as the first grade (Miller, Smith & Goldman, 1989)

and predict later drinking behavior, with one national study (PRIDE, 1992) reporting 15% of sixth graders using beer before age ten.

Recent work suggests that the third and fourth grades may represent a "critical period" for the formation of alcohol expectancies (Miller, Smith & Goldman, 1989), and thus an important time for prevention programs to target the alcohol decisionmaking process. According to Beyth-Marom, Fischhoff, Jacobs, Quadrel & Furby (1991), decisionmaking is a learned skill, and both a cognitive and an emotional exercise. Studies suggest that the most opportune time for teaching decisionmaking occurs earlier than preadolescence (Elias, et al., 1991; Austin, in press). Elias et al. assert that early teaching requires less adjustment for "developmental diversity," making curriculum design and implementation easier. They also note that success at an early age, while children still are developing attitudes, habits and orientations toward thinking and learning, increases receptivity to future instruction.

The need for earlier decisionmaking-based interventions is underscored by the fact that one important influence on children's decision-making processes for alcohol--the mass media--reaches a strong point in middle childhood. While children between 9-15 years of age report learning about things and themselves as their most common reason for liking to watch TV (Greenberg, 1974), young children in particular place a lot of trust in television, believing that it exists to entertain, educate and, finally, to tell them the truth (Dorr, 1980; Dorr, 1983). As a result, television has been criticized as a negative influence on children's attitudes and behaviors for drinking both by adults (Atkin, 1993) and by children. Some activists recommend banning alcohol advertising, while others advocate providing equal

time to anti-alcohol public service announcements (Atkin, 1993). Meanwhile, teenagers in one large-scale survey overwhelmingly responded that ads make drinking look better than it really is but nevertheless influence young people to drink more (Billings, Burton, Mertens & Strong, 1993).

Exposure and attention to beer commercials correlates with brand knowledge and positive attitudes toward alcohol (Wallack, Cassady & Grube, 1990; Austin & Nach-Ferguson, in press). Perceptions of and admiration for alcohol advertising predicts children's intentions to drink earlier and engage in problem behaviors such as binging (Austin & Meili, in press). Thus, to resist the allure of frequently viewed messages glamorizing alcohol use, children may require an additional set of skills not currently addressed in most alcohol abuse prevention programs: skills for critical viewing of television.

Critical viewing of mass media messages requires the ability to pay attention selectively, to understand implicit as well as explicit information, to understand the perspective and intentions of programmers and characters, and to understand the meaning behind techniques such as slow motion and flashbacks (Dorr, 1980). Adult-level comprehension skills may not be achieved until about eighth grade (Collins, 1982). Miller, et al. (1989) argue that because children by around third grade have acquired better communication skills just as they are becoming more attuned to social norms and peer influence, they are better able to understand media messages, but simultaneously less able to resist them.

Fortunately, however, children do not accept or act on everything they see. Things that predict imitation of media portrayals, for example, include

perceptions of realism (Reeves, 1978; Hawkins & Pingree, 1982), similarity, and identification with characters (Reeves & Garramone, 1982; Austin, Roberts & Nass, 1990), frequent exposure to consistent messages (Gerbner, Gross, Morgan & Signorielli, 1986), messages reinforced in real life (DeFleur & Ball-Rokeach, 1982; Austin et al., 1990) and by significant others (Austin et al., 1990; Austin & Meili, in press) and thus made to seem desirable, and messages about topics for which children get little information from other sources (Rosengren & Windahl, 1972; Miller & Reese, 1982). Overall, children imitate portrayals seen frequently and that seem relevant, useful, realistic and rewarding (Bandura, 1988).

The most important early influences on children's dispositions toward alcohol appear to be the parents and the mass media (Austin & Meili, in press). Austin & Meili's model predicts that television messages have effects via an information interpretation process that is both rational (via perceptions of realism and similarity) and more emotional (via desirability). They have shown that rational and emotional processing can operate in conflict or in tandem to predict identification with a television portrayal of alcohol use. According to their model, the result is that a child's belief that an alcohol ad reflects a desirable outcome can contribute to drinking likelihood but will be less likely to do so if the child has developed skills to refute the messages.

Their model, and other research on family communication and the media (e.g., Austin, 1993; Corder-Bolz, 1980) suggest that significant adults such as parents and teachers may be able to help children see television messages such as alcohol ads as less relevant, useful, realistic and rewarding. Three

assumptions underlying the Austin et al. model underscore its relevance to interpretations and effects of alcohol advertising. The first assumption is that children are active, rather than passive, viewers of the material, an assumption supported by a large body of work in media effects (Comstock & Paik, 1991). The second is that children are somewhat, but not entirely, logical about their decision-making process used to guide action, an assumption supported for supposedly more skeptical adults by a large body of work on persuasion (McGuire, 1989) and for both children and adults by decision theory (Fischhoff, 1992; Elias, et al., 1991, Fischhoff, et al., 1991). The third is that identification with portrayals will tend to predict actual behavior, an assumption congruent with social cognitive theory (Bandura, 1986).

The basic television interpretation process model introduced by Austin et al (1990) holds that acceptance of a television portrayal occurs at a number of increasingly rigorous levels. Based on a child's comparison of real-world and television-world reference groups, a child first will determine whether a portrayal is realistic, "like most people," or a norm, what is commonly accepted by society (Austin et al., 1990; Austin & Meili, in press). If perceived as realistic, a message will be more likely to survive a tougher test, that of perceived similarity, a close reflection of their own thoughts or behaviors (Austin & Meili, in press). If the portrayal is perceived as similar, the child will more likely identify with (want to be like) the portrayal, which can lead to changes in social reality construction or behavior. Desirability of a portrayal, or its perceived attractiveness (Austin & Meili, in press), also can influence identification, both on its own

and in interaction with similarity. Indeed, Austin & Meili found that perceived similarity and desirability, both alone and as an interaction, predicted identification, which predicted expectancies and intentions for drinking. Perceived realism also predicted similarity, but only in the absence of interpersonal influences, which had a stronger effect.

As a result, it appears that an intervention, such as a media literacy curriculum, targeting this decisionmaking process may help children resist alcohol. Issues such as perceived realism, fantasy, stereotypes, violence and aggression on television have been put into lessons for children from kindergarten through fifth grade with some success (Singer, Zuckerman & Singer, 1980). The results of Huesman, Eron, Klein, Brice & Fischer (1983), who successfully used critical viewing skills training to help children recognize and deal with possible adverse effects of televised violence, suggest that critical viewing skills can effect important behavioral and attitude changes. Moreover, Roberts et al. (1980) found similar curricula specific to critical television viewing was more effective with younger students, particularly for children under ten. The only known work targeting critical viewing to date in alcohol abuse prevention, however, by The Scott Newman Center, is aimed at middle school children and has tested its effectiveness only for knowledge, which can correlate with alcohol-related behavior but is not necessarily a major predictor (Austin & Nach-Ferguson, in press; Austin & Meili, in press; Grube, in press).

As a result, the current study tests the hypothesis that critical viewing training targeting specific aspects of the decision-making process as conceptualized by Austin et al. (1990) and Austin & Meili (in press), and as

illustrated in Figure 1--particularly with specific references to alcohol portrayals--will help children develop resistance skills toward media portrayals of alcohol, which should in turn help them resist alcohol.

Figure 1 About Here

Specifically, it is expected that: 1) Media literacy training specific to alcohol issues will predict lower perceived realism, less acceptance of portrayals of positive social norms for alcohol use, less identification with televised alcohol portrayals, less dangerous expectancies, and less behavioral intent and acceptance of alcohol use (that is, exhibiting preferences for alcohol-related toys); 2) More critical attitudes toward televised portrayals of alcohol use (less perceived realism, less identification, less desirability) will affect expectancies for alcohol and behaviors regarding alcohol, according to the model of media interpretation processes tested by Austin et al. (Austin, Roberts & Nass, 1990; Austin & Meili, in press). Specifically, it is hypothesized that understanding of persuasive intent (taught in the media literacy curriculum) will predict lower perceived realism and less acceptance of alcohol norms portrayed on television. Perceived realism then will positively predict perceived similarity, which will positively predict identification both as a main effect and in interaction with desirability, which also will positively affect identification. Identification will positively predict expectancies, with expectancies and identification positively affecting behavioral acceptance of alcohol.

METHOD

The hypotheses were tested via a Solomon randomized four-group style experiment. A convenience sample of 246 third graders from a northern midwestern town were randomly assigned to four groups, each with an N of at least 52. A power analysis suggests that, with 90% power, a sample of 47 will be required to detect an effect accounting for 10% of the variance, which is a conservative estimate of variance explained based on pilot testing conducted in 1993 (e.g., Gray, 1993), as shown in Table 1.

Table 1 About Here

Groups which participated in the media literacy class, which took place approximately one month after the pretest, immediately took a post-test, at the same time as the other groups. A delayed post-test (three months later) was completed by 109 students. The training began with the viewing of a videotape produced for a child audience by Consumer Reports that discusses techniques used by advertisers to sell their products. Following the video, a discussion of techniques was led by the experimenter, based on a discussion guide produced by Consumer Reports to complement the video. Randomized-order samples of advertising for beer products were shown and critiqued. A soda pop ad also was viewed and discussed, to avoid a differential sensitizing effect toward the toys. Children then received a post-test nearly identical to the pretest, with the addition of some critical viewing knowledge questions added as a manipulation check. The study achieved a response rate of 74%.

Children received bookmark-style handouts focusing on "The Three R's" of critical viewing, based on the theory of Messaris (1982) and decisionmaking theory (Fischhoff, 1992; Fischhoff et al., 1991), and as tested in Austin (1993). The R's for the children included 1) Realism; 2) Right and Wrong; and 3) Relating the information source to what other sources say.

Reliability and validity issues

Although a more lengthy, intensive intervention could be expected to have a greater effect, a single-exposure intervention was used for this study for the following reasons: 1) Schools are hesitant to give up large blocks of time for testing new curricula, particularly those that address sensitive issues. If we can show effects for a relatively minimal intervention, it should provide credibility that will make it easier to test a more detailed and involved intervention at a later time. 2) To provide the strongest internal validity, students within classrooms were randomly assigned to the experimental or control condition, which presents logistical difficulties for gaining access for multiple intervention sessions. Finally, 3) a minimal intervention can provide clues to aspects of the decisionmaking process (such as perceived realism, identification, understanding of persuasive intent) that appear either most amenable or most resistant to change, providing guidance for development of a more extensive curriculum so that development and evaluation funds will be used most effectively for long-term gain. A more intensive intervention would be much more costly to develop, implement and evaluate rigorously.

Another important issue centers on the reliability and validity of self-reports from the age group proposed for the study. Children as young as

second and third grade have been reliably surveyed in the past (e.g., Austin et al., 1990; Roberts, Bachen, Hornby, & Hernandez-Ramos, 1984; Austin & Nach-Ferguson, in press). Although the reliability of answers from younger children often is lower than those from older children, Roberts et al. found alphas for most reports from second graders to be within .01-.07 of those for sixth graders. In a few cases their reports had greater, not poorer, reliability.

Standardization across the manipulations was assured via the use of the video and the discussion guide. The settings for manipulations were similar (the classroom) and were performed during one week to control for external events.

The dependent variables for the experiments were based on the process model of television interpretation by Austin et al. (1990) and Austin & Meili (in press). The measures have been tested and refined in several previous studies with children aged 7-14 (i.e., Austin et al., 1990; Austin, 1993; Austin & Meili, in press; Austin & Nach-Ferguson, in press; Chaffeur, 1993; Gray, 1993; Nach-Ferguson, 1993). Measures used in the analysis, along with descriptive statistics at pretest, may be found in Table 2. Similarity,

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Table 2 About Here

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identification, indices to measure perceived realism, social norms, parental mediation, and expectancies also have been tested and peer reviewed, with alphas in the range of .54 to over .9, with most over .60 (Austin & Nach-Ferguson, in press; Austin & Meili, in press; Austin, 1993). The expectancy

measures appropriate for a predrinking age group were developed by adapting tested instruments from Southwick, Steele, Marlatt, & Lindell (1981), Wallack et al. (1990), and Miller, Smith & Goldman (1989). Measures of perceived realism specific to alcohol portrayals were developed by modifying operationalizations of perceived realism in the media effects literature (Potter, 1988; Austin et al., 1990; Austin & Meili, in press).

Because many children in this study were not yet making drinking decisions, and to avoid districts' and parents' concern regarding the sensitive nature of questions about alcohol use, an alternative behavioral measure was used to represent children's receptivity to alcohol. The technique of using play behavior to approximate real-life behavior has been an accepted procedure in other research focusing on sensitive issues, such as aggressive behavior. To study the effects of media violence on children, for example, measures such as the choice of a violent or nonviolent toy frequently have been used (Liebert & Sprafkin, 1988). Paralleling the procedures used to study aggressive behavior, predrinking behavior was measured via children's choice of an alcohol or nonalcohol toy. Children viewed two toys that look like cans of either soda pop or beer. They were asked to choose which toys they would prefer if they could choose one for their next birthday present.

Classroom and school effects were tested via one-way ANOVA. Within-subject repeated measures MANOVA was performed for the manipulation group that received the pretest and for the control group that received the pretest. One-way ANOVA with post-hoc testing of groups tested for group differences and Hawthorne effects. Relationships among the dependent measures, shown in Figure 1, were examined using a combination of hierarchical and forward-

listwise deletion of missing values. Variables hypothesized to occur earlier in the decision-making process but expected to have no direct relationship to the dependent variable were included among the independent variables using the forward-stepwise elimination procedure. This made it possible to test, for example, whether perceived realism predicted perceived similarity, as expected, or whether it also directly predicted expectancies and behavior, which had not been hypothesized. The forward-stepwise elimination of variables was used to preserve power relative to the small sample size, retaining in the equation only those variables contributing significantly. Reliability of indices was confirmed via factor analysis and the computation of Cronbach's alpha, with descriptive statistics of all indices contained in Table 3.

Table 3 About Here

RESULTS

The hypothesis that critical viewing training would affect children's perceptions of alcohol norms, alcohol portrayals in advertising, and alcohol-related behavior, was tested via one-way ANOVA and MANOVA. The MANOVA, which tested for within-subject change over time between pretest and post-test, was significant only for perceptions of realism ($F[1,58]=4.56$, $p<.05$). The ANOVAs, however, as shown in Table 4, showed significant group differences at post-test for the treatment and nontreatment groups on their understanding of

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Table 4 About Here

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persuasive intent ($F[3,226]=11.86$, $p<.001$), perceptions of realism ($F(3,227)=22.97$, $p<.001$), perceptions of social norms for alcohol use ($F[3,225]=5.28$, $p<.01$), and behavior ($F[3,227]=5.37$, $p<.001$). The results bordered on significance for desirability ($F[3,224]=2.38$, $p<.10$). At the delayed post-test, results were significant only for perceptions of realism ($F[3,82]=3.35$, $p<.01$). Thus, hypothesis 1 received strong support at post-test and weaker support at delayed post-test. As Table 5 shows, means were consistently in the direction predicted, even where results were not significant. For example, the treatment groups (groups 1 and 2) consistently showed more skepticism toward television portrayals than did the nontreatment groups.

Table 5 About Here

Hierarchical multiple regression analysis with stepwise regression within each block tested the hypothesis that critical attitudes toward television portrayals would predict less identification, lower expectancies for alcohol use and a lower likelihood for choosing an alcohol-related toy, according to the television interpretation process model of Austin et al. (Austin et al., 1990; Austin & Meili, in press). As shown in Table 6, and as summarized in Figure 2, the results at post-test strongly supported the hypothesized model. Understanding of persuasive intent positively predicted

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Table 6 About Here

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perceived realism and less positive social norms for alcohol use, as expected, with social norms predicting perceptions of similarity. Similarity,

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Figure 2 About Here

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in turn, predicted identification, as did desirability and the multiplicative interaction of similarity with desirability, showing that children's decisionmaking was following both a rational and an affective path to identification. Identification predicted both expectancies and behavior, as did understanding of persuasive intent and desirability, again showing both rational and affective routes to the decisionmaking process.

The results differed somewhat at delayed post-test, as shown in Table 7 and as summarized in Figure 3. Understanding of persuasive intent still

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Table 7 About Here

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predicted both perceived realism and social norms, but perceived realism predicted similarity at delayed post-test, whereas social norms had predicted similarity at post-test. Similarity still predicted identification, but

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Figure 3 About Here

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desirability no longer did so, and identification no longer predicted expectancies. Understanding of persuasive intent and desirability still predicted expectancies. There was no test predicting behavior at delayed post-test.

DISCUSSION

These results provide support for the value of media literacy programs at the third-grade level as a way to minimize the effects of alcohol advertising on the development of alcohol expectancies and related behavior among children. At post-test, critical viewing training had direct effects on perceived realism, understanding of persuasive intent, perceptions of social norms, and behavior. At the delayed post-test, the effects still remained for perceptions of realism.

The results of the regression analyses also suggest that a critical viewing intervention that targets specific aspects of the television interpretation process can have far-reaching results. At post-test, for example, understanding of persuasive intent had both direct and indirect effects on behavior, by way of its relationships with social norms and expectancies. Indirect effects were suggested by the "domino effect" of social norms on perceived similarity, which in turn predicted identification, which in turn predicted expectancies and behavior. Expectancies did not predict behavior, which was unexpected given the research on expectancies (e.g., Goldman, et al., 1987) and the finding that expectancies did predict behavioral intentions in a previous survey conducted by Austin and Meili (in press). This could have been a social desirability result, since it appeared

that the third graders in this study did exhibit some response bias, particularly on the expectancy questions.

At the delayed post-test, some suggestions of the domino effects remained, but some expected relationships were diminished or enhanced. For example, instead of social norms predicting perceived similarity, perceived realism predicted perceived similarity. Identification no longer predicted expectancies, and desirability no longer predicted identification. Understanding of persuasive intent still had a direct effect on expectancies, as did desirability. Because no behavioral measure was included in the delayed post-test, it remains unknown whether identification, understanding of persuasive intent, and desirability still would have predicted behavior as they had in the post-test. In addition, the lack of significant results could have been due partly to the reduced statistical power resulting from the smaller sample size at delayed post-test.

The lack of a relationship between identification and expectancies at the delayed post-test could have been due to the fact that alcohol advertising had become less salient to the students in June than it had been in winter and spring, when they might have been seeing more sports (and, as a result, more alcohol advertising) on television. In addition, the alcohol ads they had seen as part of the critical viewing training could have been forgotten. It seems less likely that identification, which has predicted expectancies in other research (e.g., Austin & Meili, in press) as well as in this post-test, would no longer play a potential role in predicting expectancies and behavior. The lack of a relationship between desirability and identification at the delayed post-test provides support for this interpretation of the findings,

suggesting that the characters and portrayals in the ads were simply not recalled as well at delayed post-test.

Overall, the results support the view that children in the third grade already have beliefs regarding alcohol and televised alcohol advertising. It also suggests that critical viewing training can affect these beliefs. Interestingly, rather than reducing children's perceptions of alcohol as socially acceptable (social norms), the critical viewing training appeared to hold these perceptions steady while the control groups' perceptions became more positive about alcohol use. This suggests that critical viewing training, in some cases, may serve to suppress effects that otherwise would be on the increase. A similar pattern was evident in the behavioral choice measure, in which the only groups more likely to choose the alcohol toy were the no-treatment groups at post-test. Both the treatment and control groups had begun the study with low pre-drinking behaviors. This suggests that critical viewing training may help level off harmful beliefs, which could prove important, especially with a young age group whose beliefs about alcohol are not yet well formed.

The limitations of this experiment force caution in interpreting the results. Short-term effects of the intervention were promising, and some long-term effects remained, but there was obvious decay in the effectiveness of the intervention. This could suggest that a longer-term intervention, or perhaps a more intensive intervention, may be required to provide children with decisionmaking skills that will remain effective for the long term. In addition, replication of the results with a more diverse population would be

useful, as well as a replication that included all participants at delayed post-test as well as at post-test.

Future work might attempt to identify the age group for which critical viewing training may be most effective. The results and response bias in this study suggest that even third graders already have considerable sophistication in the television viewing perceptions and their beliefs about alcohol and related social norms. Similarly, the findings of the group contrast tests showed in many cases testing effects occurred, although manipulation effects still could be identified because of the use of the Solomon four-group design methodology. This could suggest that training that targets younger students may be even more effective, or that training for students of different age groups may need to target different aspects of the decisionmaking process. It also suggests that interventions will need to be tested carefully to isolate testing effects from intervention effects.

In sum, these results suggest that third graders already have established beliefs about alcohol and alcohol portrayals on television. The results also suggest that these beliefs are not immutable to change. Children exposed to a critical viewing intervention can develop more critical decisionmaking skills to apply to the viewing context. Such interventions, however, will need to acknowledge that children's decisionmaking about television and alcohol is somewhat, but not entirely, rational. Decisions among the children in this study appeared to be based partly on logical criteria such as perceptions of realism and similarity, and partly on more affective criteria such as perceived desirability of portrayals of alcohol use on television. If, as Miller et al. have suggested (1989), third grade is a

"critical period" for the development of alcohol expectancies, these results further suggest that third grade also may be a critical period for children to receive media literacy training to help them develop sophisticated decisionmaking skills to apply to the persuasive messages they see about alcohol on television.

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Figure 1

Hypothesized model for alcohol message interpretation process

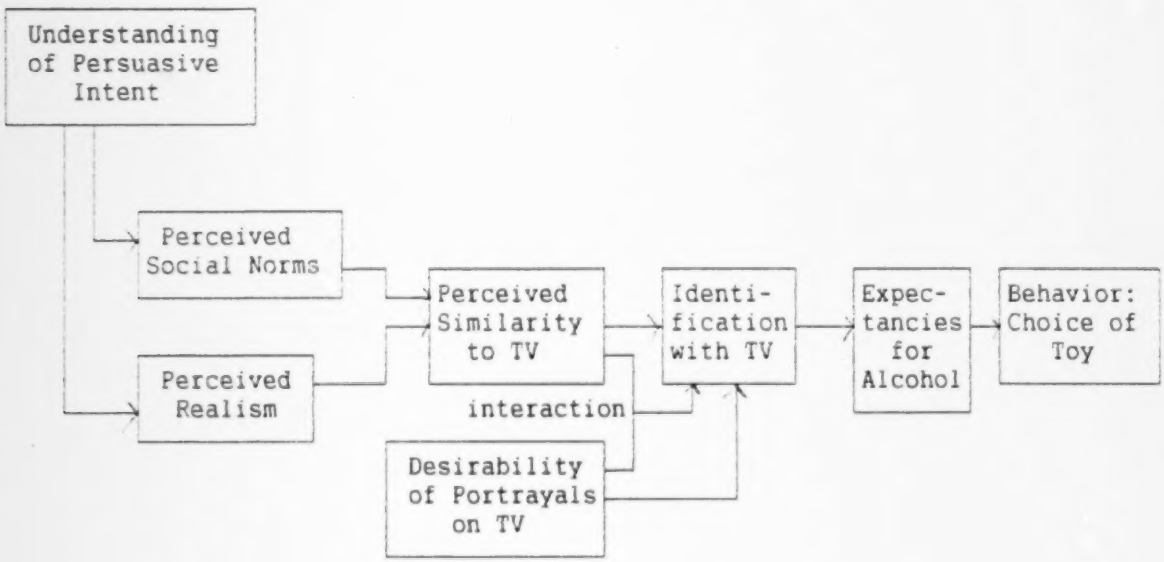


Figure 2

Summary of regression results at post-test

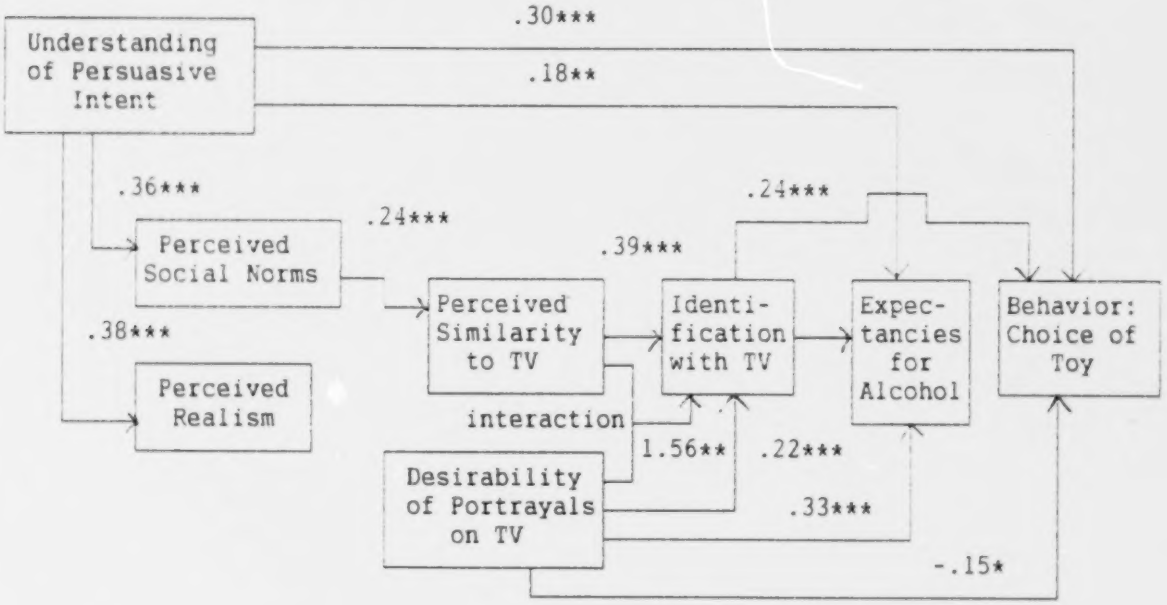
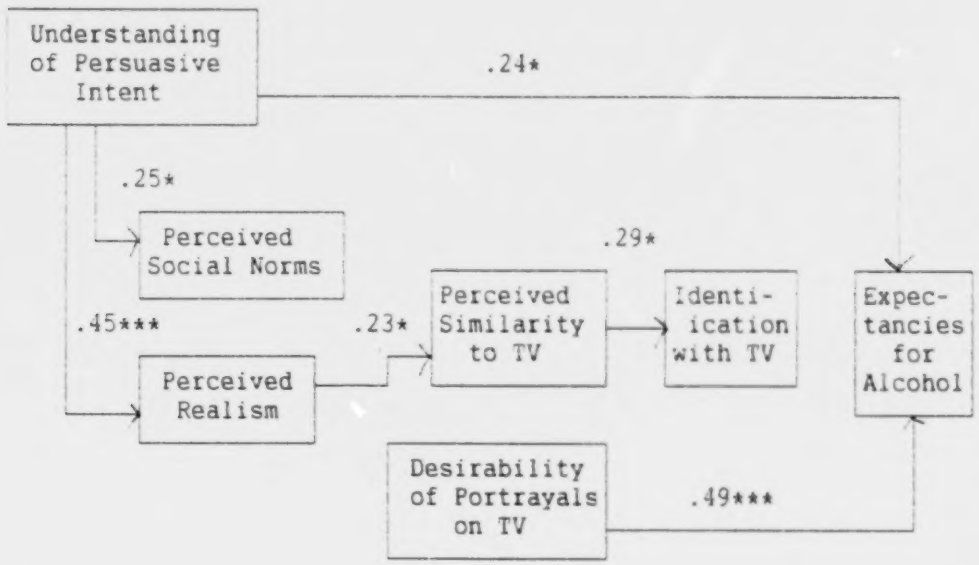


Figure 3

Summary of regression results at delayed post-test



1.The participants were randomized at all except one school, where randomization was not possible. In this school (N=83), students were assigned to groups by classroom.

Table 1

Solomon Four-Group Style Design

	Pretest	Treatment	Posttest
Group 1	X	X	X
Group 2		X	X
Group 3	X		X
Group 4			X

Table 2

Descriptive statistics for variables used to construct pretest indices*

Understanding of	N	Mean	S.D.	Range
Persuasive Intent				
People in ads want me to buy because they like me	137	1.4	.81	1-4
Ads are on TV to tell me what to buy	137	2.3	1.3	1-4
Ads on TV tell the truth	137	1.6	.85	1-4
Realism				
Real people act like people in ads	137	1.8	.90	1-4
Real people look like people in ads	137	1.7	.89	1-4
Real people do things that people in ads do	137	1.8	.86	1-4
Things that happen in ads happen in real life	137	2.0	1.1	1-4
Social Norms				
Most teens drink	137	2.5	.74	1-4
Reward after work	136	1.5	.76	1-4
Beer is at a good party	136	2.7	.81	1-4
Drinking together is a sing of friendship	135	1.3	.61	1-4
Similarity				
I do thing that people in ads do	137	1.1	.26	1-4
I like things that people in ads like	137	1.2	.51	1-4
I am like the people in ads	137	1.1	.26	1-4
People in ads are like my family	136	1.1	.43	1-4
I have as much fun as the people in ads	135	2.2	1.0	1-4
Desirability				
People in beer and wine ads are popular	137	1.7	.84	1-4
People in beer and wine ads are smart	137	1.3	.60	1-4
Men in beer and wine ads are big and strong	137	1.8	.90	1-4
Women in beer and wine ads are good looking	137	2.3	1.1	1-4
People in beer and wine ads have lots of fun	135	2.2	1.0	1-4
Identification				
I want to live my life like people in beer and wine ads	135	1.1	.27	1-4
I want to be like people who drink beer and wine on TV	136	1.0	.24	1-4
I want to be one of the people I see in beer and wine ads	137	1.1	.43	1-4
Expectancies				
Drinking makes you happier	136	1.3	.70	1-4
Drinking makes you have more fun	136	1.3	.74	1-4
Drinking makes you more grown-up	136	1.4	.83	1-4
Drinking helps you make more friends	135	1.2	.63	1-4
Behavior				
Choose between toy 1 and toy 2~	135	1.1	.30	1-2

*Same questions at posttest and delayed posttest used to construct other indices.

~1 indicates choice of alcohol toy, with 0 indicating a non-alcohol toy.

Table 3

Descriptive statistics for all indices used in the analysis

Indices:	N	Mean	SD	Range	Alpha
Understanding of Persuasive Intent					
Index at pretest	137	5.3	2.0	1-12	.37
Index at posttest	236	5.7	1.8	1-12	.38
Index at delayed posttest	86	5.0	1.7	1-12	.28
Realism					
Index at pretest	137	7.2	2.6	1-16	.63
Index at posttest	231	7.1	2.4	1-16	.66
Index at delayed posttest	86	6.7	2.0	1-16	.53
Social Norms					
Index at pretest	133	8.1	1.9	1-16	.56
Index at posttest	229	8.8	2.0	1-16	.54
Index at delayed posttest	84	8.4	1.9	1-16	.55
Similarity					
Index at pretest	136	4.5	.95	1-20	.56
Index at posttest	227	4.7	1.1	1-20	.45
Index at delayed posttest	85	4.6	.95	1-20	.46
Desirability					
Index at pretest	135	9.2	2.9	1-20	.65
Index at posttest	228	9.6	3.2	1-20	.71
Index at delayed posttest	81	10.2	3.2	1-20	.71
Identity					
Index at pretest	135	3.2	.75	1-12	.68
Index at posttest	231	3.4	.86	1-12	.62
Index at delayed posttest	85	3.2	.58	1-12	.29
Expectancies					
Index at pretest	134	5.2	2.3	1-16	.82
Index at posttest	231	5.0	1.8	1-16	.76
Index at delayed posttest	86	4.9	1.8	1-16	.79

Table 4

One-way ANOVA with group contrasts for complete Solomon four-group model at posttest and at delayed posttest *

	t	df	p
Understanding of Persuasive Intent Contrasts			
Group 1&2 v. 3&4	3.5	226	.01
Group 3 v. 4	5.0	226	.001
Group 2 v. 4	4.5	226	.001
Full Model:	F=(3,226)=11.86,p<.001		
Realism Contrasts			
Group 1&2 v. 3&4	7.3	227	.001
Group 3 v. 4	4.4	227	.001
Group 2 v. 4	7.2	227	.001
Group 1 v 3	3.0	227	.003
Full Model:	F-(3,227)=22.97,p<.001		
Social Norms Contrasts			
Group 1&2 v. 3&4	1.4	225	.09
Group 3 v. 4	3.6	225	.001
Group 2 v. 4	2.5	225	.01
Full Model:	F=(3,225)=5.28.p<.01		
Desirability Contrasts			
Group 1&2 v. 3&4	-1.7	224	.10
Full Model :	F=(3,224)=2.38,p<.10		
Behavior Contrasts			
Group 1&2 v. 3&4	2.3	226	.026
Group 3 v. 4	3.0	226	.003
Group 2 v. 4	2.2	226	.013
Full Model :	F=(3,227)=5.37, p<.001		
Delayed Posttest Realism Contrast			
Group 1 v. 3	3.1	82	.01
Full Model:	F=(3,82)=3.35,p<.01		

*Pooled variance estimate for all group contrasts. Results reported only for tests achieving significance at the p<.10 level.

Group 1 = pretest, treatment, posttest
Group 2 = treatment, posttest
Group 3 = pretest, posttest
Group 4 = posttest only

Table 5

Comparison of means across complete Solomon four-group design at posttest and delayed posttest

Posttest	Group 1	Group 2	Group 3	Group 4
Understanding of Persuasive Intent	5.3	5.4	5.4	6.9
Realism	6.2	6.1	7.3	9.0
Social norms	8.4	8.4	8.7	9.7
Similarity	4.6	4.9	4.6	4.8
Desirability	9.5	10.6	9.0	9.6
Identity	3.3	3.4	3.3	3.5
Expectancies	4.8	5.0	4.8	5.5
Behavior	1.1	1.1	1.2	1.4
Delayed Posttest	**Group 1**	**Group 2**	**Group 3**	**Group 4**
Understanding of Persuasive Intent	4.9	5.0	4.9	5.6
Realism	5.9	7.0	7.4	6.7
Social norms	8.1	8.2	8.5	8.9
Similarity	4.4	4.8	4.7	4.4
Desirability	9.4	10.5	10.3	11.5
Identity	3.1	3.1	3.4	3.6
Expectancies	4.7	5.3	4.9	5.2

Group 1 = pretest, treatment, posttest
Group 2 = treatment, posttest
Group 3 = pretest, posttest
Group 4 = posttest only

Table 6

Results of regression tests of interpretation variables on other dependent variables at posttest

Dependent Var. / Independent Var.	Beta	R^2 Change	F	df
Realism				
Und. of Pers. Intent	.38***	.14***	34.4***	1, 203
Social Norms				
Und. of Pers. Intent	.36***	.13***	29.7***	1, 203
Similarity				
Social Norms	.24***	.06***	12.8***	1, 203
Identification				
Similarity	.39***	.15***	36.1***	1, 203
Desirability	.20***	.03***	22.7***	1, 202
Sim. x Des. Interaction	1.6**	.04**	19.32***	3, 201
Expectancies				
Desirability	.33***	.11***	24.8***	1, 203
Identification	.22**	.04**	18.4***	2, 202
Und. of Pers. Intent	.18**	.03**	15.0***	3, 201
Behavior				
Und. of Pers. Intent	.30***	.09***	19.5	1, 203***
Identification	.24***	.05***	16.8	2, 202***
Desirability	-.15*	.02*	12.9	3, 201***

* =p<.05
** =p<.01
*** =p<.001

Table 7

Results of regression tests of interpretation variables on other dependent variables at delayed posttest

Dependent Var.	Beta	R^2 Change	F	df
Independent Var.				
Realism				
Und. of Pers. Intent	.45***	.21***	19.5***	1, 75
Social Norms				
Und. of Pers. Intent	.25*	.06*	5.2*	1, 75
Similarity				
Realism	.23*	.05*	4.3*	1, 75
Identification				
Similarity	.29*	.08*	6.8*	1, 75
Expectancies				
Desirability	.49***	.24***	24.2***	1, 75
Und. of Pers. Intent	.23*	.05*	15.3***	2, 74

* =p<.05
** =p<.01
*** =p<.001